

CLAIMS

We claim:

1. A cabinet for housing computer devices, the cabinet comprising:
 - an internal chamber defined by a side wall arrangement having at least a front wall;
 - a support structure configured to receive a plurality of computer devices, the support structure positioned within the internal chamber;
 - a substantially vertical duct defining a passageway for air distribution, the vertical duct positioned within the internal chamber, the vertical duct having a plurality of air discharge ports in fluid communication with the passageway; and,
 - an inlet fan in fluid communication with the passageway, the inlet fan positioned within the internal chamber.
2. The cabinet of claim 1 wherein the vertical duct is positioned proximate the support structure.
- 15 3. The cabinet of claim 2 wherein the vertical duct is positioned between the side wall arrangement and the support structure.
4. The cabinet of claim 1 wherein the inlet fan is positioned proximate the support structure.
5. The cabinet of claim 4 wherein the inlet fan is positioned between the side wall arrangement and the support structure.
- 20 6. The cabinet of claim 1 wherein the front wall is a door with a lower permeable segment, and wherein the inlet fan is positioned to draw air through the permeable segment.

7. The cabinet of claim 1 further comprising a generally horizontal duct positioned between the inlet fan and the vertical duct, wherein the horizontal duct is in fluid communication with the inlet fan and the vertical duct.
8. The cabinet of claim 1 wherein each discharge port comprises an adjustable nozzle that can be selectively adjusted to control the quantity and direction of air flowing through the nozzle.
9. The cabinet of claim 1 further comprising a second substantially vertical duct defining a second passageway for air distribution, the second duct positioned within the internal chamber, the second duct having a plurality of air discharge ports in fluid communication with the second passageway.
10. The cabinet of claim 9 further comprising a second inlet fan in fluid communication with the second passageway, the second inlet fan positioned within the internal chamber.
11. The cabinet of claim 9 wherein the second vertical duct is positioned proximate the support structure.
12. The cabinet of claim 11 wherein the second vertical duct is positioned between the side wall arrangement and the support structure.
13. The cabinet of claim 10 wherein the second inlet fan is positioned proximate the support structure.
14. The cabinet of claim 13 wherein the second inlet fan is positioned between the side wall arrangement and the support structure.

15. A cabinet for housing computer servers, the cabinet comprising:
 - an internal chamber of the cabinet defined by a side wall arrangement having at least a front wall;
 - a support structure configured to receive a plurality of servers, the support structure positioned within the internal chamber of the cabinet; and,
 - an air distribution device positioned within the internal chamber, the air distribution device having a vertical duct defining a passageway, the air distribution device further having a plurality of air discharge ports in fluid communication with the passageway; the air distribution device further having an inlet fan in fluid communication with the passageway.
16. The cabinet of claim 15 wherein the vertical duct is positioned proximate the support structure.
17. The cabinet of claim 16 wherein the vertical duct is positioned between the side wall arrangement and the support structure.
- 15 18. The cabinet of claim 15 wherein the inlet fan is positioned proximate the support structure.
19. The cabinet of claim 18 wherein the inlet fan is positioned between the side wall arrangement and the support structure.
20. The cabinet of claim 15 wherein the front wall is a door with a lower permeable segment, and wherein the inlet fan is positioned to draw air through the permeable segment.

21. The cabinet of claim 15 further comprising a generally horizontal duct positioned between the inlet fan and the vertical duct, wherein the horizontal duct is in fluid communication with the inlet fan and the vertical duct.
22. The cabinet of claim 15 wherein each discharge port comprises an adjustable nozzle that can be selectively adjusted to control the quantity and direction of air flowing through the nozzle.
23. A cabinet for housing computer devices, the cabinet assembly comprising:
 - an internal chamber of the cabinet defined by a side wall arrangement having at least a front wall;
 - 10 a first and a second support structure within the internal chamber, wherein each support structure is configured to receive a plurality of computer devices; and,
 - a first air distribution device positioned in the internal chamber, the first air distribution device having a vertical duct defining a passageway, the first air distribution device further having a plurality of air discharge ports in fluid communication with the passageway wherein the discharge ports transmit air to the first support structure, the first air distribution device further having an inlet fan in fluid communication with the passageway.
24. The cabinet of claim 23 further comprising a second air distribution device positioned in the internal chamber near the second support structure, the second air distribution device having a vertical duct defining a passageway, the second air distribution device further having a plurality of air discharge ports in fluid communication with the passageway wherein the discharge ports transmit air to the second support structure, the

second air distribution device further having an inlet fan in fluid communication with the passageway.

25. The cabinet of claim 23 wherein the vertical duct of the first air distribution device is positioned proximate the first support structure.

5 26. The cabinet of claim 25 wherein the inlet fan of the first air distribution device is positioned proximate the first support structure.

27. The cabinet of claim 23 wherein the vertical duct of the second air distribution device is positioned proximate the second support structure.

28. The cabinet of claim 27 wherein the inlet fan of the second air distribution device is positioned proximate the second support structure.

10 29. The cabinet of claim 23 wherein the front wall is a door with a lower permeable segment, and wherein the inlet fan of the first air distribution device is positioned to draw air through the permeable segment.

30. The cabinet of claim 23 wherein each discharge port comprises an adjustable nozzle that can be selectively adjusted to control the quantity and direction of air flowing through the nozzle.

15 31. A support rack for computer devices, the support rack comprising:
an assembly of vertical supports defining an interior space, the interior space having a plurality of regions;

20 an elongated duct defining a passageway for air distribution;
an inlet fan in fluid communication with the passageway;

a plurality of air discharge ports in fluid communication with the passageway;

and,

wherein at least a first discharge port is configured to supply air from the passageway to a first region of the interior space, and wherein at least a second discharge port is configured to supply air from the passageway to a second region of the interior space.

- 5 32. The support rack of claim 31 wherein the elongated duct has a second passageway for air distribution.
- 10 33. The support rack of claim 32 wherein the first passageway is in fluid communication with the first discharge port.
34. The support rack of claim 33 wherein the second passageway is in fluid communication with the second discharge port.
35. The support rack of claim 31 wherein the elongated duct is positioned proximate the assembly of vertical supports.
- 15 36. The support rack of claim 31 wherein the elongated duct is positioned adjacent to the interior space.
37. The support rack of claim 31 wherein the first and second discharge ports are adjustable nozzles.
38. The support rack of claim 31 wherein the inlet fan is positioned near a lower region of the assembly of vertical supports.
- 20 39. The support rack of claim 31 wherein each region of the interior space is configured to receive at least one computer device.

40. An air distribution device for use with a computer device storage rack, the cabinet having an internal support structure that receives a plurality of computer devices, the air distribution device comprising:

an elongated duct defining a passageway and having a plurality of air discharge

5 ports;

an inlet fan in fluid communication with the passageway; and,

wherein the discharge ports are moveable between a first position wherein air passes through the port, and a second position wherein air is prevented from passing through the port.

10 41. The air distribution device of claim 40 wherein the discharge ports are moveable to an intermediate position wherein a reduced quantity of air passes through the port.

42. The air distribution device of claim 40 wherein the elongated duct is configured to be positioned between the cabinet and the support structure, and wherein the inlet fan is configured to be positioned between the cabinet and the support structure.

15 43. The air distribution device of claim 40 wherein the inlet fan is positioned in a lower portion of the elongated duct.

44. The air distribution device of claim 40 wherein the inlet fan is in fluid communication with a lower portion of the elongated duct.

20 45. The air distribution device of claim 40 further comprising a generally horizontal duct positioned between the inlet fan and the elongated duct, wherein the horizontal duct is in fluid communication with the inlet fan and the vertical duct.

46. The air distribution device of claim 40 wherein the inlet fan has an inlet axis that is parallel to a discharge axis of the nozzles.

47. The air distribution device of claim 40 wherein the inlet fan has an inlet axis that is generally perpendicular to a discharge axis of the nozzles.
48. A method of distributing air to a stack of computer devices within a cabinet, the method comprising the following steps:

5 providing a cabinet having an internal chamber defined by a side wall arrangement, the internal chamber having a stack of computer devices supported by a support rack;

10 providing a substantially vertical duct positioned within the internal chamber, the duct defining a passageway for air distribution wherein the passageway is in fluid communication with a plurality of air discharge ports and an inlet fan;

15 drawing a quantity of air into the inlet fan through a permeable portion of the sidewall arrangement;

transmitting the air from the inlet fan to the passageway of the duct; and,

uniformly distributing the air to a frontal portion of the computer devices by

15 discharging the air from the passageway through the discharge ports.